

Appln No. 10/099,698
Amndt. Dated December 6, 2004
Reply to Office Communication of 09/17/2004
Docket No. 14XZ00157

Amendment of the Claims:

This listing of claims will replace all prior versions, and listing, of claims in the application.

Listing of Claims:

A-1
1 (currently amended): A method of determining a magnification factor in a radiography apparatus comprising means for providing an X-ray source and means for acquiring images, the source and the image acquisition being mounted so as to rotate about at least one axis with respect to a support on which an object to be X-rayed is intended to be positioned, comprising:

(a) acquiring at least two images corresponding to two different angular positions separated by an angle greater than 15° of the X-ray source and of the image acquisition with respect to the support;

(b) identifying on these images projections of at least one point of the X-rayed object; and

(c) determining the magnification factor of at least one of the images, first, as a function of the angular displacement of the X-ray source and of the image acquisition between the acquisitions of the images in question and, secondly, as a function of the positions on these images of the identified projections.

2 (canceled).

3 (original): The method according to claim 1, wherein at least two images on which an identification is carried out for the purpose of determining a magnification factor are acquired for angular positions separated by an angle greater than 20°.

4 (original): The method according to claim 2 wherein the angle is greater than 20°.

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5 (original): The method according to claim 1 wherein during an acquisition step, a plurality of images is acquired between a first and a second angular position.

6 (original): The method according to claim 2 wherein during an acquisition step, a plurality of images is acquired between a first and a second angular position.

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7 (original): The method according to claim 3 wherein during an acquisition step, a plurality of images is acquired between a first and a second angular position.

8 (currently amended): The method according to claim 1 + 4 wherein during an acquisition step, a plurality of images is acquired between a first and a second angular position.

9 (original): The method according to claim 2, wherein the identification of the projections implements automatic tracking of at least one point of the object from one image to another, on the plurality of images acquired.

10 (original): The method according to claim 3, wherein the identification of the projections implements automatic tracking of at least one point of the object from one image to another, on the plurality of images acquired.

11 (original): The method according to claim 4, wherein the identification of the projections implements automatic tracking of at least one point of the object from one image to another, on the plurality of images acquired.

12 (original): The method according to claim 5, wherein the identification of the projections implements automatic tracking of at least one point of the object from one image to another, on the plurality of images acquired.

13 (original): The method according to claim 6, wherein the automatic tracking implements monitoring by means of a similarity criterion of at least one region of the object.

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14 (original): The method according to claim 13, wherein the similarity criterion is a correlation criterion.

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15 (original): The method according to claim 5, wherein the automatic tracking implements monitoring of at least one segment that is identified on the images.

16 (currently amended): An X-ray radiography apparatus comprising:

(a) means for providing an X-ray source;
(b) means for acquiring images;
(c) the X-ray source and the means for acquiring images being mounted so as to rotate about at least one axis with respect to a support on which an object to be X-rayed is intended to be positioned;

(d) means for acquiring at least two images corresponding to two different angular positions separated by an angle greater than 15° of the X-ray source and of the image acquisition with respect to the support;

(e) means for identifying on these images projections of at least one point of the X-rayed object; and

(f) means for determining the magnification factor of at least one of the images, first, as a function of the angular displacement of the X-ray source and of the image acquisition between the acquisitions of the images in question and, secondly, as a function of the positions on these images of the identified projections.

17 (canceled).

18 (currently amended): The X-ray radiography apparatus according to claim ~~17~~ 16 wherein at least two images on which an identification is carried out for the purpose of determining a magnification factor are acquired for angular positions separated by an angle greater than 20°.

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19 (currently amended): The X-ray radiography apparatus according to claim 17 ~~16~~ wherein the angle is ~~great~~ greater than 20° .

20 (currently amended): A method of determining a magnification factor of an object in a radiographic image comprising:

providing an X-ray source;

providing a means for acquiring images;

determining a distance from the means for acquiring images to the object;

providing a first projection of the object by taking a first image of the object while the X-ray source is in a just first position in order to create the first image as a first angle with respect to a reference;

providing a second projection of the object by taking a second image of the object while the X-ray source is a second position in order to create the second image as a second angle with respect to the reference;

calculating on the basis of the projections a spatial position of a point in the object; and

calculating the distance from the X-ray source to the object based on the spatial position to determine the magnification factor.

21 (currently amended): The method of claim 20 wherein the magnification factor is determined:

(a) first, as a function of the angular displacement of the X-ray source and the means for acquiring images between the acquisitions of the images; and

(b) secondly, as a function of the position on these images of the first and second projections.

22 (original): The method of claims 20 wherein at least two images on which an identification is carried out for the purpose of determining a magnification factor are acquired for angular positions separated by an angle greater than 15° .

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23 (original): The method of claim 20 wherein at least two images on which an identification is carried out for the purpose of determining a magnification factor are acquired for angular positions separated by an angle greater than 20° .

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24 (original) The method of claim 20 wherein the identification of the projections implements automatic tracking of at least one point of the object from one image to another, on the plurality of images acquired.

25 (original): The method of claim 20 wherein the automatic tracking implements monitoring by means of a similarity criterion of at least one region of the object.

26 (original): The method of claim 20 wherein the similarity criterion is a correlation criterion.

27 (original): The method of claim 20 wherein the automatic tracking implements monitoring of at least one segment that is identified on the images.

28 (original): The method of claim 20 comprising taking a series of successive images in a burst as an acquisition rate varying from 15 images per second to 30 images per second.

29 (original): The method of claim 20 wherein the first and second angles have an angular separation between 15° and 45° .

30 (original): The method of claim 29 wherein the angular separation is 20° .

31 (original): The method of claim 20 wherein the X-ray source and the means for acquiring images rotate about at least one axis relative to the reference as a rate of between 30° per second and 90° per second.

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32 (currently amended): The method of claim 21 comprising:

taking a series of 15 images for the angular separation of 20° ~~as~~ at a rational rotational speed of 40° per second; and

for an image acquisition rate in a burst of 30 images per second.

33 (currently amended): A method for acquiring vascular radiographic images by means of a radiography device comprising an X-ray source and means for acquiring images placed facing the source, the X-ray source and the means for acquiring images being mounted so as to rotate about at least one axis with respect to a support on which an object to be X-rayed is intended to be positioned, comprising determining a magnification factor by:

(a) acquiring at least two images corresponding to two different angular positions of the X-ray source and of the image acquisition with respect to the support;

(b) identifying on these images projections of at least one point of the X-rayed object; and

(c) determining the magnification factor of at least one of the images, first, as a function of the angular displacement of the X-ray source and of the image acquisition between the acquisitions of the images in question and, secondly, as a function of the positions on these images of the identified projections.

34 (new): The method according to claim 1 wherein the angular positions are separated by an angle of between 15° and 45°.

35 (new): The method according to claim 16 wherein the angular positions are separated by an angle of between 15° and 45°.

36 (new): The X-ray radiography apparatus according to claim 33 wherein at least two images on which an identification is carried out for the purpose of determining a magnification factor are acquired for angular positions separated by an angle greater than 15°.

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37 (new): The X-ray radiography apparatus according to claim 33 wherein at least two images on which an identification is carried out for the purpose of determining a magnification factor are acquired for angular positions separated by an angle greater than 20°.

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38 (new): The method according to claim 33 wherein the angular positions are separated by an angle of between 15° and 45°.

39 (new): The method according to claim 33 wherein during an acquisition step, a plurality of images is acquired between a first and a second angular position.

40 (new): The method according to claim 33 wherein the identification of the projections implements automatic tracking of at least one point of the object from one image to another, on the plurality of images acquired.

41 (new): The method according to claim 39 wherein the automatic tracking implements monitoring by means of a similarity criterion of at least one region of the object.

42 (new): The method according to claim 41 wherein the similarity criterion is a correlation criterion.

43 (new): The method according to claim 39 wherein the automatic tracking implements monitoring of at least one segment that is identified on the images.

44 (new): The method of claim 33 comprising taking a series of successive images in a burst as an acquisition rate varying from 15 images per second to 30 images per second.

45 (new): The method of claim 33 wherein the X-ray source and the means for acquiring images rotate about at least one axis relative to the reference as a rate of between 30° per second and 90° per second.

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*Amended
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46 (new): The method of claim 33 wherein the angular separation is 20°.

47 (new): The method of claim 33 comprising:
taking a series of 15 images for the separation of 20° at a rotational speed of 40°
per second; and
for an image acquisition rate in a burst of 30 images per second.
